

SILK-SCREEN PRINTING MACHINE IN SIMPLIFIED REGISTER

The present invention refers to a silk-screen printing machine in simplified register.

5 As is known, in silk-screen printing machines equipped with a bearer structure and a printing head mobile on a silk-screen printing frame, the sheet is moved forward mechanically or manually until it reaches a predetermined position in a pincer for its
10 transportation below the silk-screen printing frame.

Pincer-carrying rods are moved, each at least at its ends by chains, which make them move forward on the printing plane, pulling the sheet to be printed at the various work stations and/or printing heads.

15 Each pincer consists of a box-shaped body with a rectangular plan and is equipped with openable jaws to grip the sheet and to allow the insertion and removal thereof.

The stop position of the sheet before being gripped is
20 determined by elements in register, which from above engage the supply plane of the sheet in the pincer and which prevent the sheet from advancing beyond the desired position.

The closing of the pincers to grip the sheet is then
25 commanded by an authorisation signal transmitted by one or more photocells aligned with the elements in

register.

In silk-screen printing machines thus realised, however, numerous drawbacks have been encountered due to the complex sequence of movements necessary to avoid
5 hindering the members in movement.

Moreover, known silk-screen printing machines are not very flexible compared to the size of the sheets which can be supplied to the machine.

The purpose of the present invention is that of
10 realising a silk-screen printing machine in simplified register which allows high precision supply of the sheets in the pincers to be obtained.

Another purpose of the present invention is that of realising a silk-screen printing machine in simplified
15 register which is adaptable to different sizes of sheets to be printed in a quick and simple manner.

Another purpose of the present invention is that of realising a silk-screen printing machine in simplified register which is particularly simple and functional,
20 with contained costs.

These purposes according to the present invention are accomplished by realising a silk-screen printing machine in simplified register as outlined in claim 1.

Further characteristics are foreseen in the dependent
25 claims.

The characteristics and advantages of a silk-screen

printing machine in simplified register according to the present invention shall become clearer from the following description, given as an example and not for limiting purposes, referring to the attached schematic
5 drawings, in which:

Figure 1 is a top side view of the side head of the supply zone of sheet elements to be printed of a silk-screen printing machine in simplified register;

Figure 2 is a top side section view realised in a
10 transversal plane in the positioning in register step of a sheet to be printed;

Figure 3 shows the section view of figure 2 of the silk-screen printing machine in simplified register, object of the present invention, in a solid
15 line in an intermediate operating step and in a broken line in the sheet gripping step;

Figure 4 is a perspective view of a detail of the supply zone of figure 3.

With reference to the figures, a silk-screen printing
20 machine in simplified register is shown, wholly indicated with 10 and comprising a bearer structure 12 on which a silk-screen printing frame (not shown) is arranged, to which a sheet element to be printed 15, consisting, for example, of a sheet of paper or another
25 support for the silk-screen printer, is conveyed in a supply plane 14. The supply plane 14 extends in a

subsequent printing plane 13, only partially indicated, lying below the silk-screen printing frame.

One or generally more pincer-carrying rods 16 mounted on chains arranged in a loop, not shown, grip the sheet
5 and pull it on the printing plane 13 between the different work stations according to that which is known.

In the supply zone of a sheet element to be printed 15 of the silk-screen printing machine in simplified register, object of the present invention, a group for
10 registering the sheet element to be printed is arranged upstream of the pincer-carrying rod 16.

The registering group, shown in detail in figures 2 and 3, comprises a transversal support plate 17 for a front
15 portion of the sheet 15, as well as a plurality of mobile elements in register 18 suitable for interacting with the supply plane 14 of the sheet immediately downstream of the plate 17 to intercept the sheet 15 in the correct position.

20 The sheet 15 is kept in the register position by a plurality of presser elements 19, also belonging to the registering group, arranged in position above the support plate 17 and mobile towards it to engage the sheet 15.

25 The plate 17 and the presser elements 19 can translate towards the pincer-carrying rod 16, being mounted

integral with a slide 20 mobile on rails 21 in the longitudinal direction, as shown in figure 1. The slide 20, actuated by an oscillating lever mechanism 22, commanded by a known actuator which is not shown, has a
5 predeterminable and variable stroke to allow the adjustment of the insertion of the sheet 15 in the pincer-carrying rod 16.

The support plate 17 is mounted on profiled elements 23 arranged transversally with respect to the supply plane
10 14 and attached at 24 to the slide 20.

The plate 17 is also equipped with frontally protruding elements 25, which are elastically retractable when pressed into abutment against the pincer-carrying rod 16, for example according to that which is shown with a
15 broken line in figure 3.

The presser elements 19 consist of a plurality of inclined elastic metal foils 28, on which means for adjusting the pressure 26 act. The presser elements 19 are slidably mounted at an upper transversal rod 27,
20 oscillating about a transversal axis thereof.

The upper transversal rod 27 also carries, on the opposite side to the presser elements 19, a supply roller 29 of the sheet. Such a roller 29 is idle and interfaces a motor roller 30 mounted on the bearer
25 structure 12 of the machine 10.

The oscillating motion of the upper rod 27

alternatively allows the sheet 15 to be supplied leaving the presser elements 19 in disengaged position before carrying out the position registration (figures 2 and 3 in a solid line), or else allows the sheet 15
5 to be engaged against the support plate 17 interrupting its supply in the plane 14 (figure 3 in a broken line). The presser elements 19 can be positioned in any point of the rod 27 at whatever interval to obtain the best engagement with the sheet in register 15 based upon the
10 specific working conditions.

The elements in register 18 of the silk-screen printing machine in simplified register 10, object of the present invention, are slidably applied to a transversal guide 31 positioned below the supply plane
15 14. The elements in register 18 comprise a metal foil 32 protruding from a base body 33, in which, in a preferred embodiment, the means 34 for detecting the presence of the sheet 15 are housed.

The detection means 34, for example consisting of
20 photocells or fibre optic sensors, transfer a authorisation signal for the transfer of the sheet 15 towards the pincer-carrying rod 16 to the oscillating lever mechanism 22 of the slide 20.

The transversal guide 31, realised as a box-shaped
25 profile, is commanded by an actuator device 35 which determines its engagement and disengagement from the

supply plane 14 of the sheet 15. In the example proposed in the figures, the guide 34 and the elements in register 18 are equipped with rotary motion about a fixed fulcrum 36, commanded by an actuator device
5 consisting of a piston 37 and a lever 38. The piston 37 is hinged at the bottom to a fixed point of the bearer structure 12 and at the top to the lever 38, which in turn is pivoted to a first end thereof at 36 and carries the transversal guide 31 at the opposite end.

10 The foils 32 are advantageously realised retractably into the base body 33, so as to be able to be rapidly activated or deactivated based upon the specific printing requirements, without the need to dismount the non-useful or even counterproductive elements in
15 register 18 for the optimal positioning in register of a sheet element to be printed 15.

The pincer-carrying rod 16 comprises a plurality of pincer elements, schematised in figures 2 and 3, equipped with jaws 40, mobile according to known ways.
20 Their edge for gripping on the sheet 15 is advantageously smooth and without seats or recesses. This allows elements pressed, possibly also with high forces, on the edge of the pincers not to be damaged during the successive printing operations.

25 In figure 3, with a solid line, the initial step of supplying the sheet 15 in the plane 14 is shown, in

which the elements in register 18 are in non-operative position. In figure 2, on the other hand, the sheet element to be printed 15 is represented in register position in abutment against the elements in register
5 18, which are in their active intercepting position of the supply plane 14 immediately downstream of the protruding elements 25 of the support plate 17. In this step the presser elements 19 are still disengaged with respect to the sheet 15.

10 When the presence of the sheet in register 15 is indicated through the detection means 34, the oscillation of the upper rod 27 places the presser elements 19 in engagement with the sheet 15. The disengagement of the elements in register 18 from the
15 plane 14 is realised through the rotation of the transversal guide 31, to which they are applied, about the fulcrum 36 (figure 3).

Then the support plate 17 and the presser elements 19, which hold the sheet 15, can move forwards pulled by
20 the movement of the slide 20 towards the pincer-carrying rod 16, going into the position shown with a broken line in figure 3.

The front edge of the sheet 15 is then held between the jaws 40 of the pincer elements, which will pull it on
25 the printing plane 13 for the printing steps.

To prepare for the supply of a new sheet element to be

printed 15 the members of the silk-screen printing machine in simplified register 10 then go back into the starting position shown with a solid line in figure 3.

The silk-screen printing machine in simplified register
5 object of the present invention has the advantage of realising the positioning of the sheet element to be printed upstream of the pincer-carrying rod, so that the registration group does not hinder the movement of the rod.

10 Moreover, the registering group comprises a plurality of elements in register and presser elements mobile in a direction transversal to the supply plane of the sheet and easily adaptable in an advantageous manner to the specific sizes and shapes of the sheet.

15 The silk-screen printing machine in simplified register thus conceived is susceptible to numerous modifications and variants, all covered by the invention; moreover, all of the detail can be replaced by technically equivalent elements. In practice, the materials used,
20 as well as the sizes, can be whatever according to the technical requirements.